

Remarks

Claims 1, 2, 6-10 and 14-24 have been amended. Reconsideration and allowance of the pending claims are respectfully requested.

Information Disclosure Statement

The Office Action objected the Information Disclosure Statement (IDS) submitted on April 9, 2008 because the indicated document numbers are incomplete. Applicant has filed new IDS with this response, which should comply with the provisions of 37 CFR 1.97, 1.98 and MPEP 609.

Claim Objections

The Office Action objected claims 2, 10 and 19 for several grammatical errors. Applicant has taken the advice of the Office Action and amended claims 2, 10 and 19. Withdrawal of the current objection is respectfully requested.

Claim Rejections under 35 USC 112

The Office Action rejected claims 1, 2, 5, 6, 8, 9, 11, 13, 14, 16 and 24 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

As discussed in M.P.E.P. 2173.02, definiteness of claim language must be analyzed, not in a vacuum, but in light of:

- (A) The content of the particular application disclosure;
- (B) The teachings of the prior art; and
- (C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

Claim 1

The Office Action rejected claim 1 because lines 2, 3-4 and 5 are unclear. Lines 2, 3-4 and 5 may be supported by paragraphs 0025-0026 and probably other parts of the specification of the present application.

In particularly, line 2 of claim 1 may be supported by lines 1-4 of paragraph 0025, lines 3-4 may be supported by lines 5-7 of paragraph 0025 and 1-4 of paragraph 0026, and line 5 may be supported by lines 4-15 of paragraph 0026.

Combining with the prior art, Applicant respectfully submits that claim 1 should be clear to a skilled person and therefore meet the requirement of USC 112. Withdrawal of the present rejection is respectfully requested.

Claim 3

It is known in the art that there are three types of virtual machine monitor (VMM), i.e., host VMM, hypervisor VMM and hybrid VMM. Under the hybrid VMM architecture, kernel component of the VMM may control processor/memory resource virtualization and probably other tasks such as domain scheduling, while a service OS running on the VMM may be responsible for device support including device virtualization/simulation and probably other tasks such as VM management.

Fig. 1 and corresponding description in the specification of the present application may have illustrated an embodiment of the hybrid VMM. Combining the prior art, Applicant respectfully submits that claim 3 should be clear to a skilled person and therefore meet the requirement of USC 112. Withdrawal of the present rejection is respectfully requested.

Claim 5

It is known in the art that under the host VMM architecture, kernel component of the VMM (i.e., kernel VMM) which monitors some system/privileged information may

run on a host operating system (OS), while virtual device may run as a user mode VMM on the host OS.

Fig. 5 and corresponding description in the specification of the present application have illustrated an embodiment of the host VMM. Combining the prior art, Applicant respectfully submits that claim 5 should be clear to a skilled person and therefore meet the requirement of USC 112. Withdrawal of the present rejection is respectfully requested.

Claim 6

Applicant respectfully submits that in-kernal virtual machine monitor is a typo and has been amended into kernel virtual machine monitor in the present response. It may be supported by component 511 of Fig. 5 and corresponding description in paragraph 0037 of the present application.

Withdrawal of the present rejection is respectfully requested.

Claim 8

The Office Action rejected claim 8 because lines 4-5 are unclear. Lines 4-5 may be supported by paragraph 0030 (especially, lines 6-8 of the paragraph 0030) and probably other parts of the specification of the present application.

Combining with the prior art, Applicant respectfully submits that claim 8 should be clear to a skilled person and therefore meet the requirement of USC 112. Withdrawal of the present rejection is respectfully requested.

Claim 9

For the similar reason proffered in claim 1, withdrawal of the present rejection is respectfully requested.

Claim 11 and 20

For the similar reason proffered in claim 3, withdrawal of the present rejection is respectfully requested.

Claim 13 and 22

For the similar reason proffered in claim 5, withdrawal of the present rejection is respectfully requested.

Claim 14 and 23

For the similar reason proffered in claim 6, withdrawal of the present rejection is respectfully requested.

Claim 16 and 24

For the similar reason proffered in claim 8, withdrawal of the present rejection is respectfully requested.

Claims Rejections Under 35 U.S.C. 101

The Office Action rejected claims 9-24 under 35 USD 101 due to being directed to non-statutory subject matter. Applicant has amended subject matter of each of claims 15-21 into **a computer readable medium**, which would cover tangible embodiments as disclosed in the specification as well as other tangible embodiments that are apparent to a skilled person. Applicant respectfully pointed out that “computer readable medium” is one of allowable subject matters according to in a USPTO guideline. Applicant respectfully requests reconsideration and withdrawal of the present rejection.

Claims Rejections Under 35 U.S.C. 102

The Official Action rejected claims 1-3 and 5-11 and 13-20 and 22-24 under 35 USC 102(b) as being anticipated by Sugerman et al (“Virtualizing I/O Device on VMware Workstation’s Hosted Virtual Machine Monitor”). Applicant respectfully requests reconsideration and withdrawal of the present rejection.

As is well-established, in order to successfully assert a prima facie case of anticipation, the Office Action must provide a single prior art document that includes every element and limitation of the claim or claims being rejected. Therefore, if even one element or limitation is missing from the cited document, the Office Action has not succeeded in making a prima facie case.

Each of claims 1-3 and 5-8 recites that determining whether **the device related operation can be handled by a first virtual device installed inside of the kernel component of the virtual machine monitor**, which is unanticipated by Sugerman.

Sugerman teaches I/O device virtualization in a hosted VMM. Under the host VMM architecture as illustrated in Fig. 3 of Sugerman, VMM runs on the host OS, device emulation is provided by VM application running on the host OS and device drivers are installed in the host OS.

The Office Action appears to rely on Section 2.2, paragraph 4, lines 2-3 of Sugerman for the teaching of the first virtual device installed inside of the kernel component of the virtual machine. Applicant respectfully submits that “the VMM exports a number of virtual I/O ports and a virtual IRQ” does not teach **where the virtual I/O device is installed in the VMM**, in kernel VMM or in user mode VMM? Further, although, as illustrated in Fig. 3 of Sugerman, the VMM includes a virtual NIC, Sugerman does not teach that the virtual NIC runs in the kernel component of the VMM. Without relevant disclosure, it should be inferred that **the virtual I/O device is**

installed outside the kernel component of the VMM, which is a conventional knowledge in the art.

Further, as stated in Session 2.1, paragraph 2, lines 7-12, accesses interacting with **physical I/O devices must** be handled in VM application, while VMM can potentially handle accesses not interacting with hardware. In Session 2.1, paragraph 2, lines 12-13, Sugerman further teaches that the virtual devices **are restricted to** only a subset of available **PC hardware**. In view of this and the example of virtualizing a network card in sections 2.2 and 2.3 (especially, section 2.2, paragraph 4, lines 1-2 stating that a virtual NIC itself is implemented via a combination of code in the VMM and the VMApp), it can be seen that the virtual devices are used for accesses interacting with the hardware which should be handled by the VM application, rather than VMM. Therefore, although Sugerman teaches that VMM can handle access not interacting with the hardware, **the access should not be handled by any virtual devices in the VMM**.

In light of the above, Sugerman teaches away from claim 1 of the present application.

Since Sugerman does not teach each and every limitation of claims 1-3 and 5-8, Sugerman does not anticipate the invention of claims 1-3 and 5-8. For similar reasons proffered above, Sugerman does not anticipate the invention of claims 9-11 and 13-20 and 22-24. Applicant respectfully requests the rejection of claims 1-3, 5-11, 13-20 and 22-24 be withdrawn.

Especially, Applicant respectfully submits that Claim 7 reciting **passing** the device related operation **to a second virtual device installed outside of the kernel component** of the virtual machine monitor, in response to determining that the device related operation can not be handled by the first virtual device, is unanticipated by Sugerman.

The Office Action appears to rely on Fig. 4 for the teaching of Claim 7. Applicant respectfully objects. Section 2.2, paragraph 1, lines 9-14, teach that virtual NIC is connected in two ways, one of which is connect to the physical NIC via virtual network hub and then virtual bridge. It should be understood that virtualization of the NIC is implemented via virtual NIC, virtual network hub and virtual bridge, which is verified in Section 2.2, paragraph 4, lines 1-2 teaching that **the virtual NIC is implemented via a combination of code in the VMM and VM application**. Further, section 2.3, paragraph 1, lines 1-3 teaches that **the packets are sent or received via virtual NIC emulation** as the above. Therefore, Sugerman teaches that the device related accessing to physical NIC must be implemented by virtual NIC in VMM, and then the VMNet driver. **There is no way to bypass the virtual NIC and handled by VMNet driver directly.**

Further, for the reason proffered in claim 1, although Sugerman teaches that VMM can handle access not interacting with the hardware, **the access should not be handled by any virtual devices in the VMM.**

In light of this, Sugerman teaches way from claim 7.

Claims Rejections Under 35 U.S.C. 103(Sugerman/Barham)

The Office Action rejects claims 4, 12 and 21 under 35. U.S.C. 103 as being unpatentable over Sugerman in view of Barham ("Xen and the Art of Virtualization"). Each of claims 4, 12 and 21 include one of claims 1, 9 and 17 as a base claim and are therefore allowable for at least the reasons stated above. Applicant respectfully requests the present rejection of claims 4, 12 and 21 be withdrawn.

Further, Applicant respectfully submits that Barham teaches a hypervior VMM which is different from hybrid VMM. It is one of three kinds of VMMs as stated in the above related to USC 112 rejection to claim 3.

Conclusion

The foregoing is submitted as a full and complete response to the Official Action. Applicant submits that the application is in condition for allowance.

Reconsideration is requested, and allowance of the pending claims is earnestly solicited.

Should it be determined that an additional fee is due under 37 CFR §§1.16 or 1.17, or any excess fee has been received, please charge that fee or credit the amount of overcharge to deposit account #02-2666. If the Examiner believes that there are any informalities, which can be corrected by an Examiner's amendment, a telephone call to the undersigned at (503) 439-8778 is respectfully solicited.

Respectfully submitted,

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